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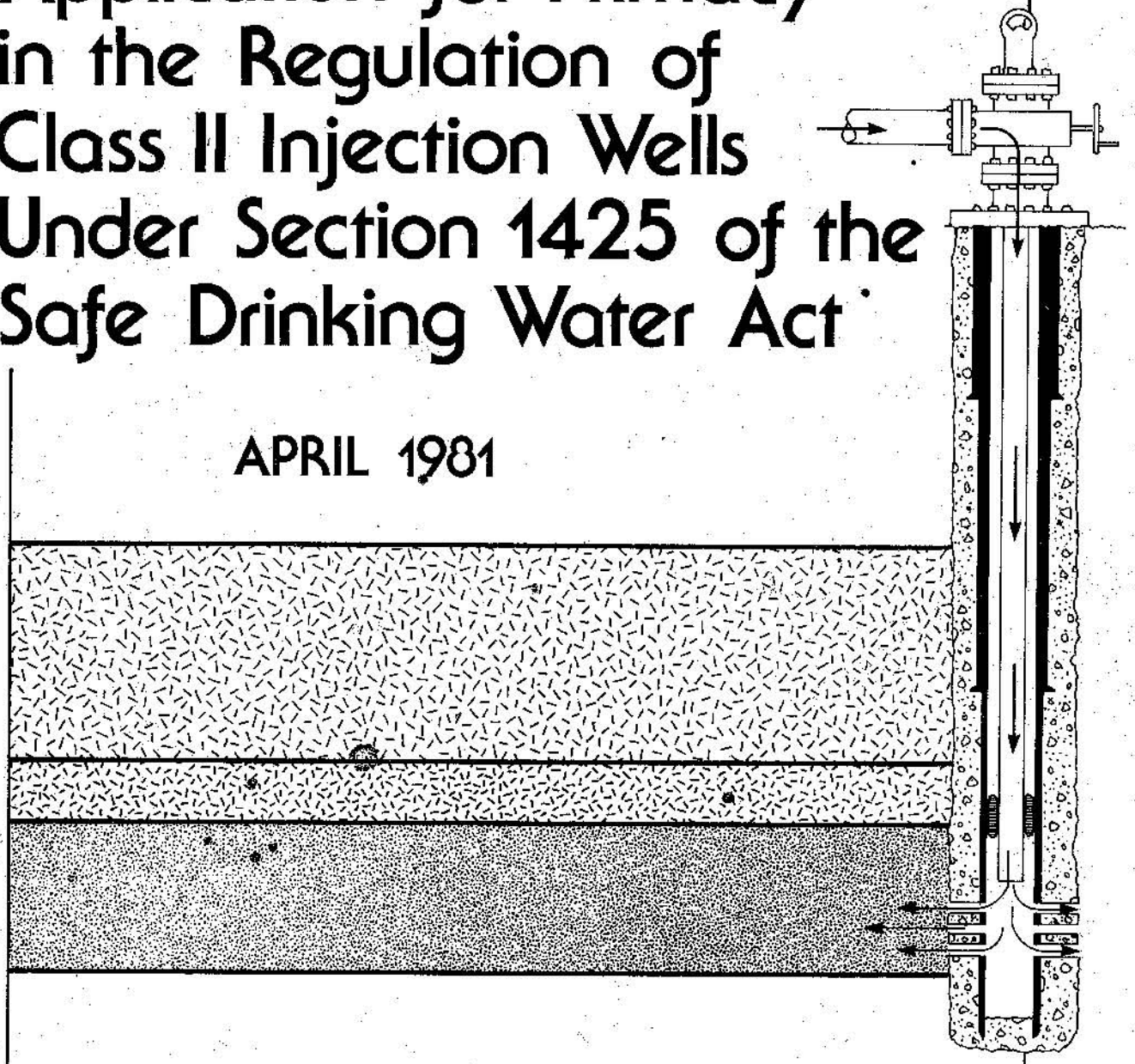
Application for Primacy in the Regulation of Class II Injection Wells Under Section 1425 of the Safe Drinking Water Act

APRIL 1981



State of California
Resources Agency
Department of Conservation
Division of Oil and Gas

APPLICATION FOR PRIMACY IN THE REGULATION OF CLASS II INJECTION WELLS UNDER SECTION 1425 OF THE SAFE DRINKING WATER ACT

The preparation of this application was financed, in part, through an Underground Injection Control Program grant from the U. S. Environmental Protection Agency, Region IX, under the provisions of Section 1442(b)(3)(c) of the Safe Drinking Water Act as amended. The grant was administered by the California State Water Resources Control Board through Interagency Agreement No. 0-099-420-0 with the California Department of Conservation, Division of Oil and Gas.

State of California

THE RESOURCES AGENCY OF CALIFORNIA

Memorandum

To : Administrator
Environmental Protection Agency
Washington, D.C. 20460

c/o Environmental Protection Agency
Region IX
215 Fremont Street
San Francisco, California

From : Department of Conservation—Division of Oil and Gas
Sacramento

Date : April 20, 1981

Subject: Application for Primacy-UIC Program, SDWA, Sec. 1425

Pursuant to Section 1425 of the Safe Drinking Water Act and the provisions of Section 1425 Guidance, the State of California, acting through the Division of Oil and Gas of the Department of Conservation, hereby requests primacy enforcement responsibility in California for those portions of the EPA's Underground Injection Control (UIC) Program for Class II wells as they relate to oil- and gas-production.

In support of the request for primacy, an application is attached that contains the following elements, as prescribed by Section 1425 Guidance.

a) A letter from the Governor requesting approval of the state program;

b) A statement of the legal authority to carry out the state program;

c) A description of the program;

d) Copies of the pertinent statutes and regulations;

e) Copies of the pertinent state forms;

f) A copy of a Memorandum of Agreement, signed by the Supervisor; and

g) Maps and data on proposed aquifer exemptions.

If you have any questions regarding the application, do not hesitate to call either Bob Reid or me at (916) 445-9686.

M. G. Mefferd
State Oil and Gas Supervisor

Attachments

State of California
Department of Justice
George Deukmejian
(PRONOUNCED DUKE-MAY-GIN)
Attorney General

3580 WILSHIRE BLVD.
LOS ANGELES 90010
(213) 736- 2125

April 1, 1981

Administrator
United States Environmental
Protection Agency
Washington, D.C. 20460

Re: Legal Authority of California
Division of Oil and Gas to
Carry Out Class II Injection
Well Program

Gentlemen:

I am a Deputy Attorney General for the State of California whose responsibilities include advising and representing the California Division of Oil and Gas in legal matters. By virtue of these responsibilities I am familiar with Division 3 of the California Public Resources Code, which contains the statutory authority for all of the Division's functions. I am familiar also with Chapter 4 of Division 2 of Title 14 of the California Administrative Code, which contains the regulations adopted by the Division in furtherance of its functions set forth in the Public Resources Code.

I have reviewed the program description being submitted by the California Division of Oil and Gas as part of its application under section 1425 of the Safe Drinking Water Act for primary enforcement responsibility for the control of underground injection related to the production of oil and gas (Class II well injection program). I have concluded that the California Division of Oil and Gas has the legal authority to carry out all aspects of the program described in its application.

Very truly yours,

ALAN V. HAGER
Deputy Attorney General

AVH:mjp

MEMORANDUM OF AGREEMENT
BETWEEN THE ENVIRONMENTAL PROTECTION AGENCY AND
THE CALIFORNIA DIVISION OF OIL AND GAS

UIC PROGRAM
SECTION 1425 - SDWA

The California Division of Oil and Gas (CDOG) of the Department of Conservation and the Environmental Protection Agency (EPA) hereby agree to carry out the terms of the Underground Injection Control Program as listed below. These terms provide a commitment that the CDOG will carry out the program as authorized by Section 1425 of the Safe Drinking Water Act and the EPA will exercise its oversight authority consistent with procedures agreed upon by both agencies.

The terms are as follows:

1. The Division of Oil and Gas will carry out the program as described in the application for primacy of Class II wells, and will support the program by an appropriate level of staff and resources to assure that underground sources of drinking water are protected.

2. The Division of Oil and Gas will recognize the Environmental Protection Agency's right to examine any pertinent state files pertaining to underground injection control.

3. The Division of Oil and Gas will participate with the EPA in the inspection of wells or operator records to the fullest extent possible. EPA shall notify the division at least ten days prior to any proposed inspection and EPA shall describe the well(s) or record(s) to be inspected and the purpose of such inspection.

4. The Division of Oil and Gas recognizes EPA's authority to take federal enforcement action under Section 1423 of the Safe Drinking Water Act in cases where the state fails to take adequate enforcement action against a person violating the applicable requirements of the Underground Injection Control Program.

5. The Division of Oil and Gas agrees to provide the EPA an annual report on the operation of the state program, the content of which may be negotiated between the EPA and the Division of Oil and Gas from time to time.

6. Aquifer exemptions for Class II wells will be consistent with aquifer exemptions for the rest of the UIC program.

7. If appropriate and necessary, provisions for implementing a joint processing procedure may be negotiated between the EPA and CDOG for those facilities and activities which require permits from both agencies under different programs.

8. For any mechanical integrity tests, other than those specified or justified in the program application, the CDOG will notify the appropriate regional administrator and provide enough information about the proposed test that a judgment about its usefulness and reliability may be made.

REGIONAL ADMINISTRATOR
ENVIRONMENTAL PROTECTION AGENCY
REGION IX

STATE DIRECTOR
CLASS II WELLS

Date

CALIFORNIA DIVISION OF OIL AND GAS PROGRAM DESCRIPTION

3.3. CALIFORNIA CLASS II INJECTION WELL PROGRAM

A. STRUCTURE, COVERAGE, AND SCOPE OF THE PROGRAM

The underground injection of fluids related to Class II injection wells is administered by the Division of Oil and Gas hereafter referred to as the (division) of the Department of Conservation. Section 3106 of the Public Recources Code (PRC) mandates, in part, the division to supervise the drilling, operation, maintenance, and abandonment of all wells (Section 3008, PRC) drilled in California for the purpose of injecting fluids for stimulating oil or gas recovery, repressuring of oil or gas reservoirs, or disposing of waste fluids from an oil or gas field. The division's authority to supervise also covers those Class II wells drilled and operated on federally owned lands.

Furthermore, Section 3106 (PRC) states that the division must supervise in a manner that will prevent, as far as possible, damage to life, health, property, and natural resources; damage to oil and gas reservoirs; loss of oil, gas, or reservoir energy; and damage to underground and surface waters that are suitable for irrigation or domestic purposes.

The division has prepared comprehensive regulations, contained in Title 14, Division 2, Chapter 4 of the California Administrative Code (CAC), that specifically pertain to the requirements that an applicant must comply with before the division will grant approval to begin a subsurface

injection project. References to statutory and regulatory authority of the division are contained within the text of the program description.

A copy of the regulations are attached. However, the procedures and information required by the regulations for project approval are summarized as follows:

The operator requesting approval for an underground injection project must provide to the appropriate division district deputy detailed data that, in the judgment of the division, are pertinent and necessary for the evaluation of a proposed project (Sections 1724.6 and 1724.7, CAC). In addition, the division requires by regulation that the operator submit as part of his application a detailed engineering study that includes a statement of the primary purpose of the project, the reservoir and fluid characteristics of each injection zone, evidence that abandoned wells within the area of review will not have an adverse effect on the project, casing diagrams and plugging information of all wells within the area of review, and the proposed well-drilling and abandonment program that is necessary to complete the project (Section 1724.7 (a), CAC).

Along with the engineering study, a geologic study and injection plan must also be submitted. At a minimum, the geologic study must include a structural and isopach map, a cross section, and a representative electric log that identifies all geologic units, formations, freshwater aquifers, and oil or gas zones (Section 1724.7(b), CAC).

An injection plan must include a map showing all wells within the area of review that penetrate the injection

interval, and schematics of surface and subsurface injection facilities; anticipated injection pressure and volumes; monitoring systems; method of injection; corrosion protective measures; and the source, analysis, and treatment of the injection fluid (Section 1724.7 (c), CAC).

Additional information can be requested for projects that may be hazardous, large, unusual, or particularly complex (Section 1724.7 (e), CAC).

In instances where an operator desires to change or modify any of the originally approved operating methods or conditions of a project, such as an increase in size, a change of the injection interval, or an increase of the injection pressure, the operator must obtain approval from the division (Section 1724.10 (a), CAC) before any change or modification is made. In addition to specific data required on division forms, sufficient information must be submitted by the operator upon request to properly evaluate the effects of the proposed change or modification (Section 1724.10(b) and (k), CAC).

B. DESCRIPTION OF THE STATE PERMITTING PROCESS

The operator of record is required to submit a complete project plan (as summarized in 3.3 A) to the division district office that has jurisdiction over the project area. Project plans must be signed by the owner or an officer or authorized agent of the company.

Before approving any project to inject fluids, wells within the area of review, including abandoned wells that

might be affected by the project, must be checked for proper casing and plugging to determine if the injected fluids will be confined to the intended zone of injection, and that adjoining operations will not be adversely affected by the project. Documentary evidence must also be provided that notification has been given to neighboring operators.

To perform the evaluations, it is incumbent upon the applicant to submit adequate engineering and geological data with an injection plan. This information will be used in conjunction with extensive geological and engineering data and well records already on file with the division to make the necessary evaluation.

Specifically, after evaluation of the data, projects that are approved by the division are subject to filing, notification, operating, and testing conditions that are required by Section 1724.10 of the regulations (CAC).

The general conditions for a project permit require the applicant to:

1. File notices of intention to drill, redrill, deepen, or rework on current division forms whenever a new well is to be drilled for use as an injection well, whenever an existing well is converted to an injection well (Section 1724.10(b), CAC), and whenever wells within the area of review require remedial work to assure that such wells will not serve as conduits to freshwater aquifers (Section 3203, PRC).

2. Notify the division of any anticipated changes in a project resulting in alteration of the conditions originally approved (Section 1724.10 (a) CAC).
3. File monthly injection reports listing the amount of fluid injected and the surface pressure required for each well (Section 1724.10(c), CAC).
4. Provide a chemical analysis of the fluid injected to the division whenever the source of injection fluid is changed, or whenever such analysis is requested by the division (Section 1724.10(d), CAC).
5. Maintain an accurate, operating pressure gauge or pressure recording chart for use on all injection wells (Section 1724.10(e), CAC).
6. Use injection piping, valves, and facilities that meet or exceed design standards for the maximum anticipated injection pressure and to maintain the equipment in a safe and leak-free condition (Section 1724.10(f), CAC).
7. Equip all injection wells, except steam, air, and pipeline quality gas wells, with tubing and a packer set immediately above the approved zone of injection. Exceptions are allowed based on documented evidence that fresh water will not be degraded (Section 1724.10(g), CAC).
8. Maintain data to show performance of the project to establish that no damage is occurring to life, health, property, and natural resources (Section 1724.10(h), CAC). The data shall be available

for periodic inspection by division personnel.

9. Cease injection if there is evidence of damage or upon written notice of the division (Section 1724.10(h), CAC).

10. Conduct a step-rate test to determine the fracture gradient of the formation before sustained injection occurs. This requirement can be waived if the division determines that injection pressure will be maintained considerably below the pressure estimated to fracture the zone (Section 1724.10(i).

11. Confirm that the injection fluid is confined to the intended zone of injection by running fluid injection profile surveys within three months after injection begins, at least once each year thereafter, after any significant anomalous rate or pressure changes, or when requested by the division. Typical monitoring surveys include radioactive tracer, spinner, and static temperature. The monitoring schedule can be modified by the division if supported by documented evidence. The district office is to be notified before surveys are made, as they may be witnessed by a division inspector (Section 1724.10(j).

Additional requirements or modifications of the above requirements may be necessary to fit specific circumstances and types of projects. Some of the example of such requirements are as follows (Section 1724.10(k), CAC):

1. Injectivity tests

2. Graphs of oil, water, and gas production vs. time.

3. Graphs of tubing pressure, casing pressure, and injection rate vs. time for each injection well.

4. Isobaric maps of the injection zone, submitted annually.

5. Notification of any change in waste disposal methods.

It is the duty of the applicant to comply with the permit conditions; however, the right to appeal any order of the division to the Director of the Department of Conservation is provided for in Section 3350 of the PRC. If the order is affirmed or modified by the director, and the applicant fails or refuses to comply with the order, such failure shall constitute a misdemeanor punishable by a fine and/or a jail sentence. Each day's further failure is considered a separate and distinct offense (Section 3359, PRC). Also, the Public Resources Code (Section 3226) provides that if within ten days following the affirmance of the order, the operator does not commence in good faith to perform and comply with the order, then the division will appoint necessary agents who will enter the property and perform the required work. Any expenditures by the division shall constitute a lien against real or personal property of the owner or operator.

C. COMPLIANCE SCHEDULES

Following approval of a project, the operator must submit notices to perform work (applications) on individual wells. Sections 3203 and 3229 of the Public Resources Code

state, in part, that "If operations have not commenced within one year of receipt of the notice, the notice will be considered cancelled." The applicant or operator may request a one year extension by submitting a supplementary notice (Section 1722(f), CAC); but the conditions for its approval are subject to change if geological, regulatory, or environmental factors warrant such change.

The operator must also comply with a testing program to confirm that injected fluids are confined to the intended zones of injection. For new injection wells or wells converted to injection, a fluid injection profile survey must be performed and witnessed by a division engineer when the injection has stabilized; and a copy of the survey must be submitted to the division within three months from the start of injection (Section 1724.10(j), CAC). Following the initial survey, a survey must be run and filed with the division once a year thereafter, after any significant anomalous rate or pressure change, or when requested by the division (Section 1724.10(j), CAC).

A monthly injection report (Form OG110B) must be filed within thirty days following each month of injection. The reports list the amount of water or steam injected for each well, the number of days, the well injected, the source of water, the kind of water, and the surface injection pressure. Failure to file the injection report is a misdemeanor (Section 3236, PRC).

If the State Oil and Gas Supervisor orders tests or

remedial work that in his judgment are necessary to protect underground water, the owner or operator must, within thirty days of the order, commence the work ordered and continue it until completion (Section 3226, PRC).

Within 60 days following completion of the well, abandonment, remedial work, or suspension of operations, the operator is required to file a detailed report of all operations. (Section 3215, PRC).

D. TRANSFER OF PERMITS

Transfer of permits is allowed when the buyer of the permitted well or wells agrees to assume and perform the original work plan of the seller and meet conditions imposed by the division. If the buyer wishes to change or modify the work plan or conditions, the buyer (new operator) must submit a new application to the division for evaluation. If circumstances warrant, the division will issue a new permit reflecting the changes and resulting conditions.

The seller must also notify the division within thirty days of any sale, assignment, conveyance, or exchange of any well; and every person who acquires the ownership or operation of any well also must notify the division within thirty days of the transaction. Notification must include the names and addresses of the buyer and seller, name and location of the well, date of acquisition and sale, and a description of the land upon which the well is located (Sections 3201 and 3202, PRC; and Section 1722.1, CAC).

Before any work can be performed on any well and before the seller can be relieved of his obligation to secure the state against any losses, charges, and expenses caused by noncompliance with imposed conditions, the buyer must submit a bond to the division that will cover the obligations covered under the seller's bond. The seller's bond will then be released (Sections 3204 and 3205, PRC; and Section 1722.1, CAC).

E. TERMINATION OF PERMITS

Permits to perform work, such as to drill or abandon a well, as well as permits to redrill, plug, or alter the casing of any well, are automatically terminated if the proposed work has not started within one year of the receipt of the notice (Section 3203, PRC). However, an approval for proposed operations may be extended for one year if the operator submits a supplementary notice prior to the expiration of the one-year period and shows good cause (Section 1722(f), CAC).

Termination of an operating injection project will also occur if there is any evidence of damage occurring as a result of the project, or upon the written notice of the division (Section 1724.10(h), CAC). Resumption of the injection operations will not be allowed until it is demonstrated to the satisfaction of the division that damage will not occur to underground drinking water sources.

F. EMERGENCY PERMITS

Provisions are made to handle emergency situations as expeditiously as possible. For instance, in an emergency

operators are permitted to deviate from the approved basic program without prior written approval of the division (Section 1722(i), CAC). Unless it is an extreme emergency where time is essential, operators normally obtain verbal approval from the division to perform emergency remedial work; however, a written notice must be submitted to the division as soon as possible to cover the work and conditions agreed upon. Additionally, if the division determines that an emergency exists, the division can order such actions as may be necessary to protect life, health, property, and natural resources (Section 3226, PRC). These actions include the order to repair, plug, or cease injection operations and to perform well tests.

G. AVAILABILITY AND USES OF VARIANCES AND OTHER DISCRETIONARY EXEMPTIONS TO PROGRAMMATIC REQUIREMENTS

Variances from standard freshwater protection measures can be approved when geologic or groundwater conditions dictate. Special plugging procedures are required to prevent the downward percolation of poor quality surface waters that could contaminate useable subsurface waters; to separate zones of varying water quality; and to isolate dry sands that are in hydraulic continuity with groundwater aquifers (Section 1723.2(c), CAC).

The division may also set forth other plugging and abandonment requirements or may establish field rules for the plugging and abandonment of wells (Section 1723.8, CAC). When sufficient geologic and engineering information is available from previous drilling or operating history, plugging and abandonment requirements and operating

conditions that differ from those prescribed by regulation can be established as field rules for any oil or gas pool or zone in the field (Sections 1723.8 and 1722(m), CAC). Before establishing or changing a field rule, the division must distribute the rule or change to companies and persons affected by the rule or change and allow thirty days for comments (Section 1722(m), CAC).

Variances can also be granted to the surface casing setting depths and the casing cementing requirements for all casing strings, as long as the requirements are consistent with known geological and engineering conditions (Sections 1722.3(b) and 1722.4, CAC).

H. DESCRIPTION OF THE RULES USED BY THE STATE TO REGULATE CLASS II WELLS

As described in the previous subsection, special "field rules" can be established that deviate from the original requirements when sufficient geological and engineering information is available to indicate that a proposed rule will not cause damage to life, health, property, and natural resources.

Except for the field rules, all well operations must comply with the requirements set forth in the original project approval and to the permit conditions for individual wells, established pursuant to the regulations in Title 14, CAC.

I. TECHNICAL REQUIREMENTS APPLIED TO OPERATORS BY THE STATE PROGRAM

All wells, including Class II, are cased and cemented in a manner consistent with good oilfield practice. Each

well must be equipped with casing designed to provide anchorage to competent strata for the installation of blowout prevention equipment and to seal off formation fluids and segregate them for the protection of all oil, gas, and freshwater zones. All casing strings are required to be designed for the anticipated collapse, burst, and tension forces, with the appropriate design safety factor to allow for a safe operation. Casing setting depths are based upon geological and engineering factors that include the presence or absence of hydrocarbons, and lost circulation intervals; and upon formation pressures, fracture gradients, and depth to the base of fresh waters. (Section 3220, PRC and Section 1722.2, CAC).

For new wells, operators are required to cement conductor casing to a maximum depth of 100 feet, exceptions may be granted if special conditions require a deeper casing depth. As a general rule, surface casing is cemented at a depth of 10% of the proposed depth of the well, with a minimum of 200 feet and a maximum of 1,500 feet of casing. An intermediate string of casing may also be required, in addition to a production string, if it is necessary for the protection of oil, gas, and freshwater zones, or for protection against other drilling hazards (Section 1722.3(c), CAC).

Production casing is cemented and tested for mechanical integrity above the zone or zones to be produced or injected into, or through the zone or zones then selectively perforated. When the production casing is cemented above

the zone, a perforated liner is run and landed opposite the zone. When the production string does not extend to the surface, an overlap of at least 100 feet between the production string and the next larger string is required. The overlap must be cemented and pressure tested to assure there is a competent seal (Section 1722.3(d), CAC).

All the above casing strings are required to be cemented with a sufficient amount of cement to prevent the movement of injected fluids into underground sources of drinking water. Surface casing annular space is cemented from the setting depth to the surface and intermediate and production strings are cemented to at least 500 feet above oil and gas zones and to at least 100 feet above the base of the freshwater zones (Section 1722.4, CAC).

All wells, including newly converted Class II wells are required to have mechanical integrity demonstrated by performing fluid injection surveys to demonstrate that the injected fluids are confined to the zones of intended injection (Section 1724.10(j), CAC).

For the plugging and abandonment of wells, cement plugs are placed across specified intervals to protect oil and gas zones, to prevent the degradation of useable waters, to protect surface conditions, and to protect public health and safety. At the discretion of the division, cement may be mixed with or replaced by other substances having adequate physical properties to provide the required protection (Section 1723(a), CAC).

In addition to the cement plugs, mud fluids having the

proper weight and consistency to prevent movement of other fluids into the well bore must be placed across all intervals not covered by cement plugs (Section 1723(b), CAC).

To prevent the degradation of useable waters in uncased wells, the division requires the placement of at least a 200-foot cement plug across all fresh-saltwater interfaces. For cased holes that are cemented across the fresh-saltwater interface, a 100-foot cement plug is required to be placed inside the casing opposite the interface. If there is no cement in the annular space opposite the interface, squeeze-cementing into the annulus is required prior to placing the 100-foot plug inside the case (Section 1723.2(b), CAC).

To establish maximum allowable surface injection pressures, operators are required to perform a rate-pressure test to determine the fracture gradient of the formation into which fluids are to be injected. This requirement can be waived or modified if the division determines that the injection pressure will be maintained considerably below the estimated pressure required to fracture the zone of injection (Section 1724.10(i), CAC).

J. AREA OF REVIEW

Prior to the approval of a project involving injection of fluids, the operator must submit an engineering study that includes casing diagrams indicating the location of cement plugs, and the actual or calculated cement fill behind the casings of all idle, abandoned, or deeper-zone producing wells within the area affected by the

project, and evidence that abandoned wells in the area will not have an adverse effect on the project or cause damage to life, health, property, and natural resources (Section 1724.7(a) (4), CAC). A flood pattern map showing all injection, production, and abandoned wells must also be included with the engineering study (Section 1724.7(a) (5), CAC).

The Division of Oil and Gas will utilize the one-quarter (1/4) mile fixed radius of review as set forth in 40 CFR 146.06(b); and if the appropriate data are available, a radial flow equation as shown in Section 40 CFR 146.06(a) may also be used to determine the zone of endangering influence.

Additionally, to provide the area of review concept a degree of flexibility, specifically known and documented geological features may limit the need to review all the wells within a 1/4-mile radius. This concept will be utilized in conjunction with the fixed radius method.

K. DESCRIPTION OF THE DIVISION PROCEDURES FOR MONITORING AND INSPECTION, AND REQUIRED REPORTING FROM OPERATORS

To detect and remedy injection system failures, all injection wells are monitored by division technical personnel utilizing engineering and geological expertise to provide close technical surveillance. The division's regulatory authority is used to take remedial or corrective measures when warranted.

Monthly injection reports must be filed with the division within thirty days following the month of injection. The

reports must be on an individual well basis and they must indicate the amount of fluid injected, the number of days injected, the surface injection pressure, the source and kind of water and if necessary, the reason why the well did not inject fluid (Section 3236, PRC and Section 1724.10 (c), CAC).

All injection wells must be tested and monitored to ensure that injected fluids are confined to the intended zones. Injection surveys must be submitted to the division within three months after injection begins and annually thereafter. Typical surveys used to monitor injection wells are the radioactive tracer, spinner, and static temperature. The monitoring schedule may be modified if supported by evidence indicating that fresh waters will not be degradated as a result of the modification. Division inspectors witness the running of the initial survey, and if circumstances warrant, they will also witness the running of surveys that are conducted annually. Surveys that are not witnessed and reviewed on-site are reviewed by CDOG engineers when the survey is filed with the appropriate district office. If the CDOG reviewer determines the survey to be inconclusive a "resurvey" may be ordered or other remedial action taken as indicated by the survey review (Section 1724.10(j), CAC).

The operator of any well must keep and submit to the division an accurate record of each operation performed on each well showing chronologically the following data when applicable (Section 1724, CAC):

1. Character and depth of all formations, water-bearing strata, oil and gas zones, lost circulation zones, and abnormal pressure zones encountered.
2. Casing size, weight, grade, type, condition (new or used), top, bottom, and perforations; and any equipment attached to the casing.
3. Tubing size and depth, location of packers, safety devices, and other equipment.
4. Hole sizes.
5. Cementing and plugging operations including date, depth, slurry volume and composition, fluid displacement, pumping pressures, amount of cement fill, and downhole equipment.
6. Drill-stem or other formation tests, including date, duration, depth, pressures, and recovery.
7. Water shut-off, pressure, and lap tests of casings.
8. Sidetracked casing, tools, or other material in the hole.
9. Depth and type of all electrical, physical, or chemical logs, tests, or surveys made.
10. Production or injection method and equipment.
11. Core records showing depth, character, and fluid content.
12. Such other information that the division may require to carry out its mandates.

All the above information is retained by the division on a permanent basis.

Plugging and abandonment operations required for fresh-water

protection are witnessed by division inspectors to assure that the plugs are properly placed. Specifically, division inspectors may witness the placing of the plug in an open hole; however, they are required to witness the location and hardness of all freshwater-saltwater interface plugs (Section 1723.7(d) (1), CAC).

For cementing operations in a cased hole, division inspectors are required to witness all operations that require squeeze-cementing through perforations. If a cavity shot is required, for the purpose of providing a continuous seal behind and inside uncemented casing, inspectors may witness the shooting; however, as in the case of open hole, inspectors are required to witness the location and hardness of the plug across the cavity shot (Section 1723.7(d) (2) and (3), CAC).

Financial responsibility for the plugging of injection wells when abandonment is warranted is managed by several methods in California. An operator may demonstrate financial responsibility by filing an individual bond for each well drilled or a blanket bond covering all well operations.

Individual bonds are normally released after an operator demonstrates to the satisfaction of the division that a well is mechanically sound after the well has injected fluids for a six-month continuous period. Blanket bonds are not normally released until all the operator's wells are abandoned or until the operator specifically requests the release of a well from bond coverage. However, this

release can only occur after the well is demonstrated to be mechanically sound following six months of continuous injection (Sections 3204 & 3205, PRC).

After the release of a bond, the division still has the authority to order an operator to perform remedial or corrective work on a well. The order is issued if, in the judgment of the division, such work is necessary to prevent damage to life, health, property, and natural resources, or to prevent the infiltration of detrimental substances into underground or surface waters suitable for irrigation or domestic purposes (Section 3224, PRC).

If the operator fails to perform the required work, the division can appoint agents to enter the property and perform the necessary work. All expenditures constitute a lien against the real or personal property of the owner or operator (Section 3226, PRC).

The division may also order the abandonment of any well that has been deserted whether or not any damage is occurring or threatened. Removal of the production equipment or facilities is prima facie evidence of desertion (Section 3237, PRC).

A special well abandonment allotment is also available in California for the purpose of abandoning deserted wells when the last known operator is deceased, defunct, or no longer in business in California and the present surface and mineral estate owners did not receive a substantial financial gain from the wells (Section 3250 and 3251, PRC).

L. STATE'S ENFORCEMENT PROGRAM

When the division finds or determines that there is a compliance deficiency or a violation of its rules and regulations, the procedure is to inform the owner or operator immediately of the problem in order to arrive at an expeditious resolution.

If no action is obtained through this procedure within a reasonable time, the division can issue a formal order to the operator to perform the required work. In the absence of an appeal or within thirty days following denial of an appeal, the state can cause the work to be performed by agents of the state if the operator has not made a good faith effort to perform the required work.

Section 3224 (PRC) provides the division authority to order any remedial work that is necessary to prevent damage to life, health, property, and natural resources. And, in accordance with Section 3226, if an emergency situation exists, the division can take any action deemed necessary, which could include the severance of operations to protect life, health, property, and natural resources.

Failure or neglect on the part of any person to comply with any order of the division constitutes a misdemeanor, and each day's further failure or refusal, or neglect is a separate and distinct offense (Section 3359, PRC).

In addition, any owner, operator, or employee of the owner who hinders or refuses to permit the division to inspect a well, causes the delay of the enforcement of division rules and regulations, fails or neglects or re-

fuses to furnish any required report or record is guilty of a misdemeanor (Section 3236, PRC).

The misdemeanor is punishable by a fine of not less than one hundred dollars or more than five hundred dollars, or by imprisonment for not exceeding six months or by both fine and imprisonment (Section 3236, PRC).

The threat of severance or closure of any activity, including an associated production activity, that contributes to the degradation of fresh water is an effective incentive to an operator to correct the problem.

M. AQUIFER EXEMPTION PROCESS

After the division provides a public notice and the opportunity for public hearings, the division will identify and describe those aquifers or portions thereof which the division proposes to designate as an "exempt aquifer." To exempt an aquifer, the aquifer must meet the following criteria which is set forth in 40 CFR 146.04:

1. The aquifer does not currently serve as a source of drinking water; and
2. The aquifer cannot now and will not in the future serve as a source of drinking water because:
   (a) It is mineral, hydrocarbon, or geothermal energy producing.
   (b) It is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical.
   (c) It is so contaminated that it would be economically

or technologically impractical to render that water fit for human consumption.

A list of the aquifers exempted by the above procedures is attached as part of the state submittal under Section 1425 of the SDWA.

Subsequent to program approval, identification of additional aquifers that qualify for exemption may be made by the division; however, any person who wishes to have an aquifer designated must submit to the division information including detailed maps and supportive data that would justify the proposed exemption. If there is sufficient evidence to indicate that an exemption may be justified, the division will provide notice and opportunity for a public hearing.

N. STATE STAFFING AND RESOURCES

In fiscal year 1981-82, a budget of $5,328,136 and 133.3 authorized personnel years is proposed for the CDOG to conduct the Oil, Gas, and Geothermal Protection Program. This is an increase of 4 percent in funds and 2 percent in staff over the previous year. Well work is expected to increase about 5 percent (8,000 to 8,400) and the total number of wells to be regulated is expected to increase about 1 percent (78,400 to 79,500). Almost 90 percent of the total resources and staff ($4,752,280 and 118.8 personnel years) are allocated for the regulation of oil and gas operations, approximately 11 percent of which ($522,751 and 13.1 personnel years) will be expended for underground injection control associated with such operations. Regulation of oil and gas operations is carried out under the overall direction of the State Oil and Gas

Supervisor and the Chief Deputy. Localized direction is provided by six district deputies (see attached organization chart). As required by PRC Sections 3103 and 3104, all deputies must be competent engineers or geologists, registered in the state, and experienced in the development and production of oil and gas. Deputies of large districts (Long Beach and Bakersfield offices) are Supervising Oil and Gas Engineers, while those of small districts are Senior Oil and Gas Engineers. Engineering unit supervisors in large districts are also Senior Oil and Gas Engineers.

Associate Oil and Gas Engineers in districts (designated as lead, area, operations, or project engineers on the organization chart) evaluate and permit all projects and operations proposed by oil and gas operators, monitor and study operations, prepare technical and legal directives, and coordinate field investigation. Energy and Mineral Resources Engineers (designated as field engineers on the organization chart) and Petroleum Technical Assistants or Junior Engineering Technicians (designated as field technicians) conduct required tests and inspections on a 24-hour basis, seven days per week. In calendar year 1980, the field staff performed 18,191 of 19,205 required tests and inspections statewide.

Minimum qualifications for oil and gas engineer positions include a degree in geology or petroleum engineering, and/or specific knowledges and abilities, education, and experience in the field of petroleum engineering or geology as follows:

	Years of Work Experience	Years or Management Experience	Total
Supervising Engr.	3+	2	5+
Senior Engr.	4	--	4
Associate Engr.	3(1)	--	3(1)
Energy & Mineral Resources Engr.	0-4	--	0-4

NOTE: (1) Years of required work experience depend upon years of college education completed.

O. OTHER AGENCY INVOLVEMENT

The CDOG has the primary responsibility for controlling Class II well operations in California. The State Water Resources Control Board (SWRCB) has broader responsibility for controlling the quality of California's water resources. An agreement exists between the two agencies, whereby the division provides copies of Class II injection project approval letters and well permits to Regional Water Quality Control Boards. This relationship also allows for unified enforcement action where appropriate.

P. INVENTORY OF CLASS II WELLS

An inventory of Class II wells in California has been completed and supplied to the EPA Regional Adminstrator through the SWRCB. An updated inventory will be supplied with each annual report to EPA.

Q. REVIEW OF EXISTING CLASS II WELLS

Section 1724.10(h) of the CAC requires periodic review of the performance and safety of existing underground injection projects. Current division policy requires that these project reviews be conducted at least annually. Within this current program practice, all existing Class II

projects in California will be reviewed within 12 months.

R. PUBLIC PARTICIPATION

The policy of the division will be to publish public notices in major California newspapers of wide circulation inviting public review and comment for proposed new underground injection projects, or for substantial changes in the permit conditions of existing projects. Public hearing may be held prior to the issuance of new permits or modifications of existing permits at the discretion of the State Oil and Gas Supervisor. Public response to the published notices will be the prime factor in determining whether a public hearing is warranted.

S. COMPLAINT RESPONSE PROCEDURES

Informal complaints concerning underground injection projects may be made by anyone and are usually made by telephone or in person. These complaints are investigated by the district deputy basically in the same manner as formal complaints. An attempt is made by the district deputy to resolve informal complaints in an expeditious and informal manner whenever possible; however, enforcement action is sometimes required.

Pursuant to PRC Section 3235, a formal complaint must be made in writing by a person owning land or operating wells within a radius of one mile of the well or wells complained against. Upon receipt of a formal complaint, the district deputy proceeds as follows:

1. Gathers and summarizes pertinent information about the subject well or wells from district records.

2. Outlines investigatory actions that will be taken to determine the condition of the well or wells, and the validity of the complaint. This may include interviewing complainant and the well operator(s), reviewing operator records, field inspecting wells and facilities, conducting specific field tests, or taking other surveillance action.

3. Sends the information summary and investigation outline, along with a copy of the complaint, to the State Oil and Gas Supervisor.

4. After consultation with the Supervisor or Chief Deputy, conducts the investigation and makes a written report, including official determination of any conditions to be remedied or repaired, and the procedure and method for such mitigation.

5. Sends a copy of the report to the complainant, the owner or operator of the well or wells, and the State Oil and Gas Supervisor.

6. Follows procedures for taking enforcement action to achieve required abatement of damaging conditions.

T. PAST PRACTICE IN THE USE OF ENFORCEMENT TOOLS

Following is a brief description of some of the CDOG's recent enforcement actions involving underground injection projects.

1. In July 1979, the division's district deputy in Santa Maria held a meeting of the operators of the San Ardo field in Monterey County, to discuss the potential and probability of subsurface contamination of aquifers above

the wastewater-disposal zone, the Santa Margarita sand. The meeting was scheduled because of the high gauge-pressures noted during radioactive tracer surveys of Santa Margarita disposal wells, and other indications of pressure increases in the Santa Margarita.

At the request of the division, the operators agreed to phase out injection into the Santa Margarita, equip two wells for continual pressure monitoring and, if necessary, to dewater the sand through former injection wells. As of February 1981, injection in the affected part of the field has ceased and zone pressures are monitored through the two observation wells. Dewatering is not considered necessary.

2. Although the following case does not pertain to a problem involving an USDW, it illustrates the effectiveness of the CDOG with regard to problems arising from underground injection operations.

In the spring of 1980, it was brought to the attention of the division that Monterey zone injection along the western edge of Cat Canyon field, Santa Barbara County, had a high degree of probability for affecting oil production and development drilling on leases just west of the injectors. The division brought this matter to the attention of the operators of Monterey zone injection wells with a request to show cause

for continued injection or arrange for alternate means of disposing of waste water.

The division's action resulted in: (a) Chevron's installation of a four-mile pipeline to divert the waste water to a waterflood project in another pool; (b) Mobil's shutting in of an injection well on the White lease; (c) Shell's substantiation that no damage was likely to result from injection into the Monterey because of wells nearby producing from the same zone; and (d) Shell's development of a wastewater regeneration project, which should be completed by mid-1981, and a diversion of some injection water to wells less critically located.

3. As a result of a review of injection pressures in wastewater disposal wells, in Cat Canyon field, Santa Barbara County, it was noted that Texaco Inc.'s well WD-3, which was injecting into the S1b sand, had an injection pressure in excess of estimated formation fracturing pressure. The operator was requested to run a pressure falloff survey to determine the approximate pressure conditions in the general area of the injection well. As the static gauge pressure failed to bleed off over a fairly extended period of time, it was concluded that zone pressure was considerably in excess of hydrostatic pressure and that a potential existed for migration of water-up fault planes and into freshwater-bearing strata, or into strata in hydraulic continuity therewith. Consequently, the injection permit was rescinded.